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THE USE OF SPECIAL DRESSINGS AS ADVANCED WOUND THERAPIES: A LITERATURE REVIEW

O USO DE CURATIVOS ESPECIAIS COMO TERAPIAS AVANÇADAS DE FERIDAS: UMA REVISÃO DE LITERATURA

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Abstract: Introduction: The treatment of chronic and complex wounds includes clinical and surgical methods. The dressing is presented as a clinical intervention most frequently used to improve the conditions of the wound bed, or in some situations, it can be configured as a definitive approach or as a step towards surgical treatment. Nowadays, different types of dressings are used in the therapeutic arsenal to assist in the integument parts and facilitate technical repair. **Objective**: The present study aimed to analyze the different types of dressings available on the market as advanced wound therapies. **Methodology**: This is a literature review, with a descriptive approach, carried out in September 2024 in the PubMed database. The inclusion criteria were articles with free full texts, clinical trials, meta-analysis and controlled studies, which addressed the

topic, obtaining 26 articles as a final sample. Results: The included studies indicate that special dressings can be effective in treating wounds and that these applied resources optimize patient improvement. **Discussion**: These findings highlight that the use of advanced technologies in wound dressings and therapies offers clinical, functional, and economic benefits. **Conclusion**: The present study indicates the need for further robust studies to consolidate scientific evidence.

Keywords: Biological dressings. Bandages, Hydrocolloid. Negative-Pressure Wound Therapy. Occlusive dressings.

INTRODUCTION

Wound healing involves a complex and dynamic cascade of processes to restore skin integrity. In particular, the management of chronic and complex wounds presents a major challenge in the clinical practice of many healthcare professionals, since a number of factors such as the pathophysiology of the disease, the presence of comorbidities, age, obesity, medication use, nutrition-related aspects, as well as the presence of infection, can hinder tissue repair. These situations may require the use of appropriate materials and technologies that promote healing. Dressing has been an important area of biomedical materials research. (1)

In this context, advances in the development of industrialized dressings have brought a wide range of products to the market, each with specific characteristics for different types of injuries (2). Dressings act to maintain a moist environment, which is essential for tissue repair and healing, as well as promoting angiogenesis and autolytic debridement (3).

However, choosing the ideal dressing depends on evaluating certain aspects, such as the type of exudate, the depth of the lesion, the presence of infection, and the need for debridement or bacterial control (2), as well as carefully evaluating the condition of the wound bed and the patient. For example, in wounds with extensive necrotic plaques, surgical debridement may be necessary, while in areas with superficial necrosis, chemical debridement may be sufficient to reverse the condition (4).

In addition, the use of advanced dressings, such as hydrocolloids, calcium alginate, and vacuum dressings, has provided significant gains for healthcare practice. These products have high absorption capacity and protection against external contamination, which benefits the different stages of healing and various types of wounds, from pressure ulcers to complex traumatic wounds. However, the choice of appropriate dressing is influenced by several factors, including cost, ease of application, and adaptability to the patient's needs (5).

Therefore, in-depth knowledge of the types of dressings is essential for more efficient and safer clinical practice. Thus, exploring the different types of dressings available on the market, highlighting their compositions, mechanisms of action, indications, and contraindications, and how their proper use can positively impact wound treatment is essential, since each patient's individual response may be different, even under apparently similar conditions. Given this, the objective of this study was to analyze the different types of dressings available on the market as advanced wound therapies.

METHODS

The search was conducted in the PubMed database in September 2024. The keywords "Biological dressings. Bandages, Hydrocolloid. Negative-Pressure Wound Therapy. Occlusive dressings" were used, with no restrictions on language or search period. The following filters were applied: Free Full Text, Clinical Trial, Meta-Analysis, and Randomized Controlled Trial, to ensure the inclusion of studies with free full access and high methodological quality, such as clinical trials, meta-analyses, and randomized controlled trials. The selection of articles followed the criteria of relevance and topicality, prioritizing those that addressed advanced wound treatments. The first stage of the search in the research database was the filter applied to the keywords in the titles of the articles.

The keyword search revealed a variation in the number of publications over the last few years. In 2019, 60 articles were found, with a gradual increase in the following years. In 2020, the number of publications rose to 125, and in 2021 it reached 148. Growth continued in 2022, with 168 articles, and peaked in 2023, with 175 publications. In 2024, there was a slight decrease, resulting in 166 articles. For the year 2025, only one publication was identified, indicating the proximity to the search date (September 25, 2024). When the filters were applied, 49 articles were identified. After analyzing the duplicates, seven articles were excluded, leaving 42 articles for reading titles and abstracts.

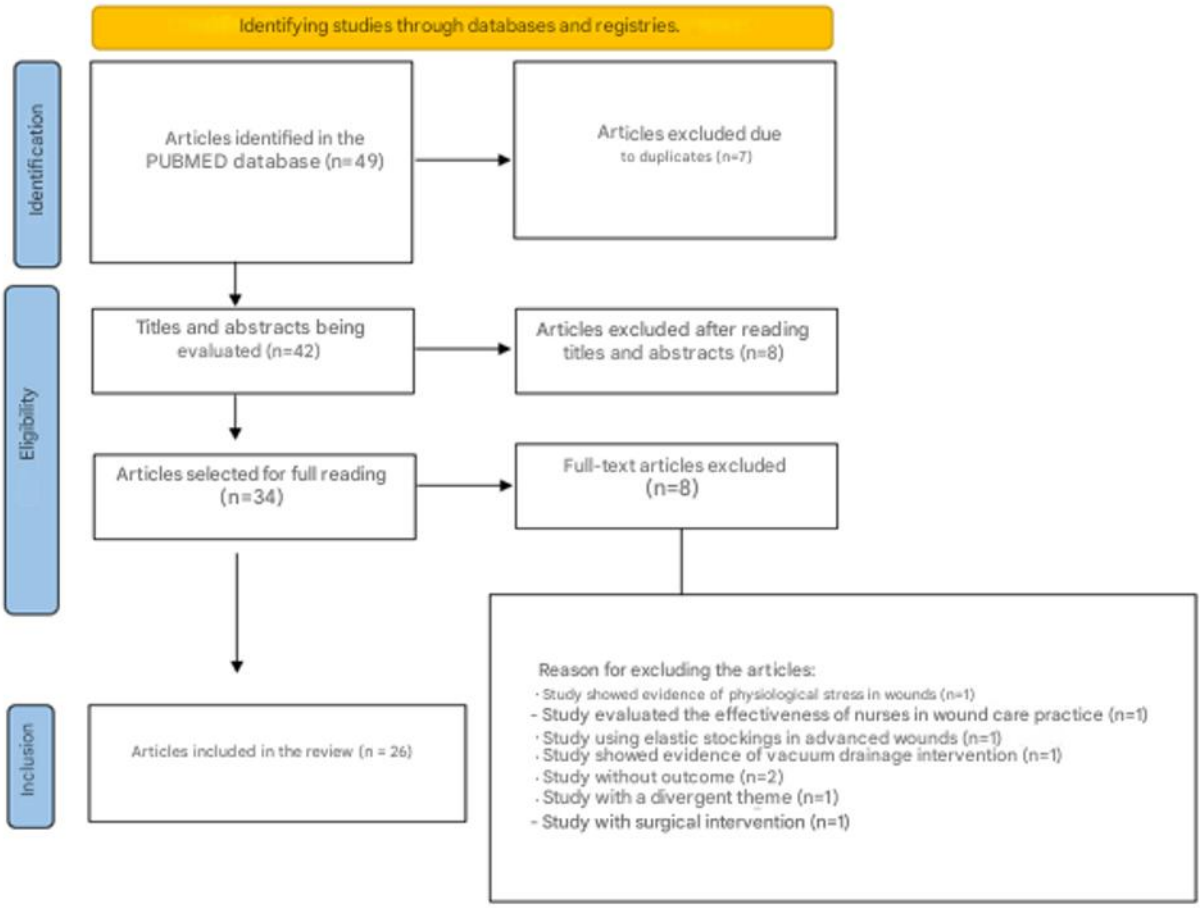
Studies that did not directly address the topic of advanced wound dressings were excluded from the analysis, as were opinion articles, narrative reviews, and uncontrolled case studies, which were described as exclusion criteria for the research. Duplicate studies or those whose results were not available in a free full text were also excluded. The second stage of the process consisted of peer reading of the abstracts of the selected articles. Two independent reviewers analyzed the abstracts to determine whether or not to include the studies, based on the previously established inclusion and exclusion criteria. In cases of disagreement, a third reviewer was consulted to reach a consensus.

Thus, after reading the titles and abstracts, eight articles were excluded, leaving 34 articles to be read in full, according to the exclusion criteria mentioned above.

During the full-text review phase, eight articles were excluded. One of the excluded studies was an early-stage pilot study entitled *"Protocol for a pilot randomized controlled clinical trial to compare the effectiveness of a graduated three-layer straight tubular bandaging system when compared to a standard short-stretch compression bandaging system in the management of people with."* The second article was not included because it is currently being concluded: *LEAK study: design of a nationwide randomized controlled trial to find the best way to treat wound leakage after primary hip and knee arthroplasty.* And the third: *Tilbrook H, Clark L, Cook L, et al. AVURT: aspirin versus placebo for the treatment of venous leg ulcers – a Phase II pilot randomized controlled trial. Southampton (UK): NIHR Journals Library; 2018 Oct. (Health Technology Assessment, No. 22.55.)* The fourth is unfinished: *Sandy-Hodgetts, K., Norman, R., Edmondston, S., Haywood, Z., Davies, L., Hulsdunk, K., Barlow, J., & Yates, P. (2022). A non-randomised pragmatic trial for the early detection and prevention of surgical wound complications using an advanced hydropolymer wound dressing and smartphone technology: The EDISON trial protocol. International Wound Journal, 19(8), 2174–2182.. doi:10.1111/iwj.13823. PMCID: PMC9705176. PMID: 35799456.* The fifth was a literature review: *Wasiak J, Cleland H, Campbell F, Spinks A. Dressings for superficial and partial thickness burns. Cochrane Database Syst Rev. 2013 Mar 28;2013(3): CD002106. doi: 10.1002/14651858.CD002106.pub4. PMID: 23543513; PMCID: PMC7065523.* The sixth is a literature review with a meta-analysis.: *Sun SY, Li Y, Gao YY, Ran XW. Efficacy and Safety of Pentoxifylline for Venous Leg Ulcers: An Updated Meta-Analysis. Int J Low Extrem Wounds. 2024 Jun;23(2):264-274. doi: 10.1177/15347346211050769. Epub 2021 Nov 15. PMID: 34779680.* The seventh was a literature review: *Dumville JC, O'Meara S, Deshpande S, Speak K. Hydrogel dressings for healing diabetic foot ulcers. Cochrane Database Syst Rev. 2011 Sep 7;(9): CD009101. doi: 10.1002/14651858.CD009101.pub2. Update in: Cochrane Database Syst Rev. 2013 Jul 12;(7): CD009101. doi: 10.1002/14651858.CD009101.pub3. PMID: 21901730.* The Eighth review with meta-analysis: *Luo Y, Li L, Zhao P, Yang C, Zhang J. Effectiveness of silver dressings in the treatment of diabetic foot ulcers: a systematic review and meta-analysis. J Wound Care. 2022 Nov 2;31(11):979-986. Doi: 10.12968/jowc. 2022.31.11.979. PMID: 36367799.*

Two of the articles from the search were literature reviews: *"Effectiveness of silver dressings in the treatment of diabetic foot ulcers: a systematic review and meta-analysis" and "Hydrogel dressings for healing diabetic foot ulcers."* These were excluded. Thus, a total of twenty-six articles were included in this literature review, as shown in **Figure 1.**

Figure 1 – Flowchart of the selection of articles in this literature review.



Source: Authors' own work, 2024.

RESULTS

A total of 26 articles were included for data tabulation after the selection process. The study results are described in Table 1.

Table 1 – Summary of the evidence on special dressings used as advanced wound therapies.

Authors/Year	Study design	Inclusion criteria	Intervention Group	Control Group	How many times per week	Results	Conclusion
Zelen, CM, Gould, LJ, Serena, TE, Carter, MJ, Keller, J, Li, WW, 2014[6]	Prospective, randomized, controlled clinical trial.	> 18 years old, with type 1 or type 2 diabetes. Ulcer size ≥ and < 25 cm²; Ulcer duration ≥ 4 weeks.	*EpiFix*	*Apligraf®*	Once daily for 7 days, for 12 weeks.	Complete healing occurred in 4 patients, corresponding to 35% (7/20) of the patients who received Apligraf and in 85% (17/20) of the patients who received EpiFix.	Wounds treated with EpiFix had significantly higher rates of complete healing at 4 weeks.
Armstrong DG, Orgill DP, Galiano RD, Glat PM, Kaufman JP, Carter MJ, 2024[7]	Prospective, randomized, controlled, multicenter clinical trial.	=18 years old; chronic diabetic foot ulcers (DFUs), Wagner Grade 1; present for ≥ 4 weeks before screening but ≤ 1 year; index ulcer size ≥ 1.0 and ≤ 25 cm².	*Purified, reconstituted bilayer matrix (PRBM)*	Standard of care *(SOC)*	Study visits were conducted weekly.	DFUs treated with PRBM healed at a higher rate than those treated with SOC (p = 0,005).	DFUs heal faster when treated with PRBM.
Omar AA, Mavor AI, Jones AM, Homer-Vanniasinkam S, 2004[8]	Pilot study	Chronic venous leg ulcers, > 12 weeks in duration, with an area ranging from 3 to 25 cm².	*Dermagraft*	Non-irritating local dressings.	Weekly for 12 weeks in an outpatient setting.	50% of the Dermagraft group demonstrated healing at the end of 12 weeks.	The *Dermagraft* may accelerate the healing of chronic venous leg ulcers.
Zelen CM, Serena TE, Gould L, Le L, Carter MJ, Keller J, Li WW, 2018[9]	Prospective, randomized, controlled, multicenter clinical trial.	≥ 18 years of age; Type 1 or Type 2 diabetes mellitus; Diabetic foot ulcer > 1 cm²; Minimum duration of 4 weeks.	Dehydrated human amnion-chorion allograft *(dHACA)*	*SOC*	The SOC group underwent daily dressing changes with collagen alginate, while the dHACA group received weekly treatment.	Wound closure in 6 weeks, 68% in the group dHACA and 15% in the group SOC. Healing at 12 weeks occurred in 38 days for the dHACA group and 72 days for	dHACA is clinically superior to SOC, cost-effective, and an effective treatment for chronic non-healing diabetic foot

						the SOC group.	ulcers.
Lund-Nielsen B, Adamsen L, Gottrup F, Rorth M, Tolver A, Kolmos HJ, 2011[10]	Randomized Clinical Trial.	≥ 18 years of age, with malignant wounds and advanced-stage cancer.	Silver-impregnated dressings.	Honey-impregnated dressings.	Wound treatment was administered at the patient's home, 2 to 3 times per week.	After 4 weeks of treatment, no significant differences were observed in the types of bacteria in the wounds of either group.	In this study, dressings coated with honey or silver did not influence qualitative bacteriology.
Hakkarainen T, Koivuniemi R, Kosonen M, Escobedo-Lucea C, Sanz-Garcia A, Vuola J, Valtonen J, Tammela P 2016[11]	Clinical Trial.	Patients were selected by a plastic surgeon based on clinical evaluation.	Wood-based nanofibrillar cellulose *(NFC)* dressing.	Commercial *lactocapromer dressing, Suprathel® (PMI)*	Outpatient at the clinic from postoperative day 11 to 75.	The NFC dressing detaches from the donor site in an average of 18 days, whereas Suprathel® detaches in 22 days.	NFC appeared to be highly biocompatible in the treatment of skin graft donor sites.
Z8 Armstrong DG, Galiano RD, Orgill DP, Glat PM, Carter MJ, Di Domenico LA, Reyzelman AM, Zelen CM, 2022[12]	Prospective, randomized, controlled, multicenter clinical trial.	≥18 years; Wagner grade 1 DFU: >4 weeks prior to study screening and <1 year in duration. Size >1.0 cm² and <25 cm².	Cryopreserved bioactive skin allograft *(BSA)*	Standard of care (SOC, collagen alginate dressing)	Weekly, for 12 weeks.	The results showed that 76% of patients in the BSA group achieved complete ulcer healing, compared to only 36% in the SOC group.	The use of the bioactive allograft resulted in a significant improvement in wound healing. Its addition is effective in the healing of diabetic ulcers.
Pérez-Acevedo G, Torra-Bou JE, Peiró-Garcia A, Vilalta-Vital I, Urrea-Ayala M, Bosch-Alcaraz A,	Randomized clinical trial.	Patients under 18 years of age underwent surgery for non-idiopathic scoliosis.	Single-use incisional negative pressure wound therapy system *(iNPWT)*	Hydrofiber and silver hydrocolloid dressing	7 days during the postoperative period.	The initial costs of iNPWT were higher, but the total postoperative costs were greater for	iNPWT is cost-effective in preventing surgical wound complications in children

Blanco-Blanco J. 2024[13]						the hydrofiber and silver hydrocolloid dressing group.	undergoing surgery for non-idiopathic scoliosis.
Biffi R, Fattori L, Bertani E, Radice D, Rotmensz N, Misitano P, Cenciarelli S, 2012 [14]	Randomized, double-blind clinical trial.	Patients younger than 18 years and under 75 years, undergoing elective colorectal cancer surgery via laparotomic approach.	*Aquacel Ag Hydrofiber*	Standard dressing.	Once daily during hospitalization. Removed on the seventh postoperative day.	The overall surgical site infection rate was lower in the experimental group than in the control group.	The Aquacel Ag Hydrofiber dressing showed a reduction in the overall SSI rate compared to a standard postoperative dressing in major elective open colorectal procedures.
Arroyo AA, Casanova PL, Soriano JV, Torra I Bou JE. 2013[15]	Open clinical trial.	>18 years; undergoing scheduled surgery resulting in a postoperative wound expected to heal by primary intention.	Surgical dressing with polyurethane film.	Surgical gauze dressings.		The polyurethane film dressing results in a significant reduction in SSI.	Polyurethane film surgical dressings can significantly reduce the rate of superficial SSI compared to traditional postoperative treatment.
Tettelbach W, Cazzell S, Reyzelman AM, Sigal F, Caporusso JM, Agnew OS, 2018[16]	Prospective, randomized, controlled, multicenter clinical trial.	Patients >18 years, with type 1 or type 2 diabetes. Ulcer size ≥1 cm² and <25 cm²; ulcer duration ≥4 weeks.	Dehydrated human amniotic membrane allograft *(dHACM)*	Standard alginate dressing and secondary non-adhesive absorbent hydro-polymer dressing.	Patients were seen weekly at the clinic for wound cleansing.	Participants in the dHACM group had a significantly higher probability of complete healing than those who did not receive dHACM.	dHACM is an effective treatment for lower extremity diabetic ulcers.

ABEDINI, Fereydoon; AHMADI, Abdollah; YAVARI, karam; HOSSEINI, 2012[17]	Randomized clinical trial.	Total body surface area burn <40%, <24 hours post-burn injury, and total body surface area (TBSA) between 10% and 40%.	*Aquacel*®	AgSD cream 1%	*Aquacel*® dressings were changed every 7 days. AgSD dressings were changed daily.	*Aquacel*® is superior in healing, helps in the regeneration and re-epithelialization of burn wounds, minimizes patient pain during dressing changes, and reduces healing time.	*Aquacel*® significantly reduced hospital stay duration, analgesic use, wound infection, and inflammation compared to silver sulfadiazine.
Serena TE, Orgill DP, Armstrong DG, Glat PM, Carter MJ, Kaufman JP, 2022[18]	Randomized, controlled, open, organized, multicenter clinical trial.	Patients >18 years; with chronic venous ulcers; wound area ≥2 cm² and <20 cm².	Dehydrated human amniotic membrane allograft *(dHACA)*	Standard treatment alone.	Weekly and every two weeks.	After 12 weeks, more venous leg ulcers healed with dHACA (75%) than in the group that received standard treatment alone (30%).	dHACA was significantly more effective and safer compared to standard treatment alone.
Tettelbach, W, Cazzell, S, Sigal, F, Caporusso, JM, Agnew, PS, Hanft, J, Dove, C, 2019[19]	A multicenter, randomized, controlled clinical trial.	Individuals with type 1 or type 2 diabetes presenting ulcers of 1 to 15 cm², for at least 30 days.	Dehydrated human umbilical cord *(EpiCord)*	Alginate dressings	At 12 weeks, the DFU was cleaned and debrided. Total follow-up was 16 weeks.	The *EpiCord* group was more likely to heal within 12 weeks than those who received alginate dressings, with healing rates of 70% versus 48% for *EpiCord* and alginate dressings, respectively.	Greater wound healing was observed in ulcers treated with *EpiCord* compared to those treated with alginate dressings (P=0,0152).
Chan, RK, Nuutila, K,	A multicenter,	Patients >18 and <65 years,	Electroceutical dressing	Standard treatment.	The dressings	*WED* (p <0,05)	This study

Mathew-Steiner, SS, Diaz, V, Anselmo, K, Batchinsky, M, Carlsson, A, 2024[20]	randomized, controlled clinical trial.	presenting acute wound(s) caused by trauma or burn.	*(WED)*		were changed on days 4 and 7.	reduced or prevented biofilm growth in all wounds compared to wounds treated with paired *SOC.*	corroborates the anti-biofilm efficacy of WED in burn wounds and supports its safety in the context of human subjects.
Pierrefeu-Lagrange, Anne-Claire; MARI, Karine; HOSS, Caroline; CULLEN, Breda; NISBET, Lorraine. 2018[21]	A multicenter, randomized, controlled clinical trial.	Adults aged ≥21 years. Wounds >4 cm² in size, <7 days in duration.	Cellulose acetate mesh with soft silicone *(CAM)*	Flexible polyamide net *(FPN)*	Once a week, for 4 weeks. Three dressing changes were performed during the study for each patient.	The results showed that the CAM dressing performed as well as the FPN dressing and was clinically effective in reducing dressing-related trauma issues.	The *CAM* coated with soft silicone performed as well as the *FPN* contact layer in minimizing dressing adherence, time to complete re-epitheliali zation, and patient tolerance.
Michel T Longaker, Rod J. Rohrich, Lauren Greenberg, Heathr Furnas, Robert Wald, Vivek Bansal. 2014[22]	Randomized clinical trial.	Individuals >18 and <65 years, who underwent abdominoplasty within 1 week (4 to 8 days).	Advanced Scar Therapy *(Embrace)*	Ideal care methods of the surgeon.	13 weeks.	At 12 months, scars treated with Embrace showed significant improvements in pigmentation, flexibility, height/roughness, and vascularity.	The Embrace device minimizes scarring in a challenging surgical procedure over a 1-year period.
Catalfamo L, Belli E, Nava C, Mici E, Calvo A, D'Alessandro B, De	Double-blind study	67 years old, with oral mucosal lesions.	*Promogran* (contendo colágeno regenerado oxidado) e *Hyalomatri* (contendo	Conventional collagen-based medications.	The collagen medication was changed twice daily, whereas	Advanced medications allowed healing in half the number of days	Advanced medications allowed us to improve the

Ponte FS. 2023[23]			ácido hialurônico)		the hyaluronic acid was changed after 2 weeks.	compared to patients in the convention al medication group.	healing of oral wounds.
Wooding H, Yan J, Yuan L, Chyou TY Gao S, Ward I, Hest PM. 2018[24]	Randomized clinical trial.	All patients who received radiotherapy for mucosal squamous cell carcinoma and also for nasopharyngea l carcinoma.	*Mepitel Film*	Cream	The Film was applied by the researcher to the skin area randomize d to Film, whereas the Cream was applied twice daily.	The Film reduced the overall severity of skin reaction by 29% and the rates of moist desquamati on by 37% in the Chinese cohort, and by 27% and 28% respectivel y.	*Mepitel Film* is more effective in patients with head and neck cancer who do not have a beard.
Zulbaran-Rojas A, Mishra R, Pham A, Suliburk J, Najafi B. 2021[25]	Randomized controlled clinical trial.	Patients >18 and <85 years, who underwent cervicotomy.	*TransCu O2*	Standard treatment (SOC)	Weekly	At 4 weeks, 88.8% of the interventio n group achieved a significant >10% reduction in scar size compared to the CG (28.5%).	The results suggest that the advanced dressing using continuou s diffusion of oxygen (CDO) therapy may improve wound healing, showing better visual outcomes.
Nherera LM, Trueman P, Karlakki SL. 2017[26]	Open-label randomized clinical trial.	Patients aged ≥18 years undergoing hip and knee surgery.	Single-use negative pressure wound therapy *(sNPWT)*	Film dressings.	Once a week, for 6 weeks.	The average total costs for patients in the sNPWT group were lower than those in the control group.	sNPWT is a cost-effective interventi on to reduce SSI after total hip and knee replaceme nt.

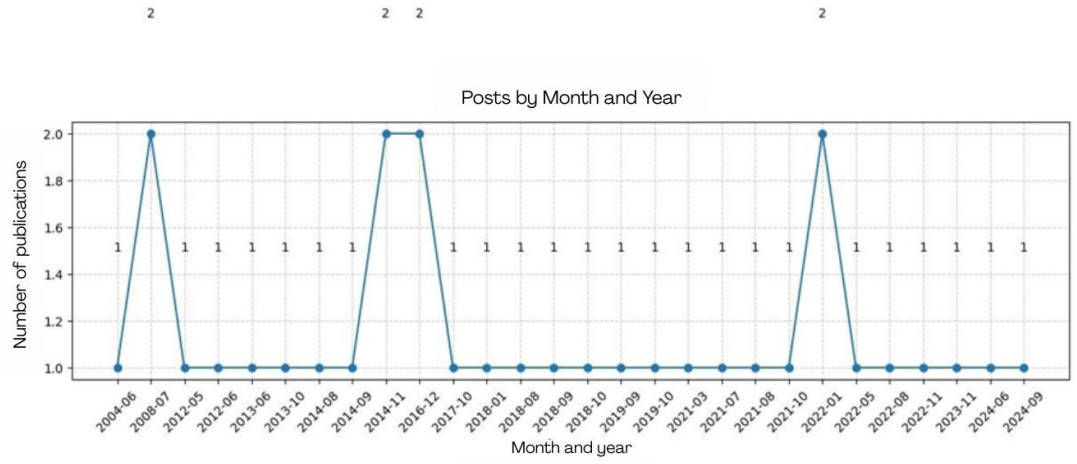
Forni C, Gazineo D, Allegrini E, Bolgeo T, Brugnolli A, Canzan F. 2022[27]	Randomized, open-label, parallel-group, multicenter clinical trial.	Patients aged ≥18 years undergoing hip and knee surgery, who developed pressure ulcers *(PU).*	Polyurethane foam dressing with silicone.	Standard preventive care.	Diamonds	Polyurethane foam significantly reduced sacral pressure ulcers in patients admitted to medical units.	Multilayer polyurethane foam dressing with adhesive silicone is effective in preventing pressure ulcers in at-risk hospitalized patients.
Kirsner RS, Margolis DJ, Baldursson BT, Petursdottir K, Davidsson OB, Weir D, 2019[28]	Prospective, double-blind, randomized, comparative clinical trial	Patients >18 and <60 years old.	Fish skin graft	*dHACM*	Participants were seen on days 7, 14, 18, 21, 25, and 28 for wound status assessment.	Wounds treated with fish skin healed significantly faster.	Acute puncture wounds treated with fish skin grafts heal more rapidly.
Armstrong, DG, Orgill, DP, Galiano, RD, Glat, PM, Kaufman, JP 2022[29]	A multicenter, randomized, controlled clinical trial.	10 years, presence of Wagner grade 1 DFU, with the target ulcer offloaded for at least 14 days prior.	Purified, reconstituted bilayer matrix *(PRBM)*	*SOC*	4 to 6 weeks.	Complete wound healing was achieved in 76% (38/50) of patients in the *PRBM* group, compared to 36% (18/50) in the *SOC* group.	In conclusion, the addition of PRBM to SOC appeared to significantly improve wound healing.
Hakkarainen T, Koivuniemi R, Kosonen M, Escobedo-Lucea C, Sanz-Garcia A, Vuola J. 2016[30]	Clinical trial.	Burned patients.	Nanofibrillar cellulose *(NFC)*	Lactocapromer, Suprathel®	No changes, observation only.	Epithelialization of the donor site covered with the NFC dressing was faster compared to Suprathel®.	NFC appeared to be highly biocompatible in the treatment of skin graft donor sites.
Armstrong DG, Galiano RD, Orgill DP, Glat PM, Carter	Multicenter, prospective, randomized, controlled clinical trial.	Patients ≥18 years of age, with type 1 or type 2 diabetes;	Purified, reconstituted bilayer matrix *(PRBM)*	Collagen-alginate dressing.	Weekly, until complete 12 weeks.	*PRBM* had a significantly higher closure rate	*PRBM* accelerated the healing of chronic

MJ, Di Domenico LA. 2022[31]		Wagner grade 1 DFU; ulcer present for >4 weeks.				than those treated with SOC.	wounds, favorable for closure.

Source: Authors' owns work, 2024.

In Figure 2, it is possible to see the analysis of the number of studies published per month over the years.

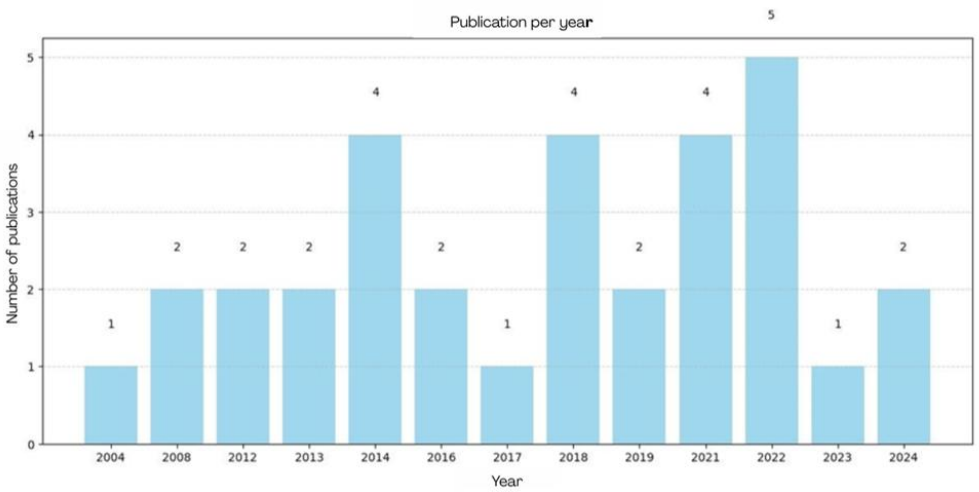
Figure 2 - Analysis of the number of studies published per month over the year.



Source: Authors' own work, 2024.

When analyzing publications by year, it was found that the year with the highest number of publications was 2022, with a total of 5 publications. The lowest number of publications was in 2004, with only 1 publication, as shown in Figure 3.

Figure 3- Analysis of the number of studies published per year.



Source: Authors' own work, 2024.

The study of keywords in scientific publications on advanced dressings allows the identification of trends and predominant thematic focuses in the field. In Portuguese, the most frequent words were **feridas** (12 occurrences), representing the main object of study, and **tratamento (**11 occurrences), highlighting the focus on therapeutic interventions. In English, the most frequent words were **wound** (26 occurrences), reflecting the emphasis on lesions and their clinical management; **advanced** (9 occurrences), indicating a focus on innovative technologies and strategies; and **diabetic** (8 occurrences), suggesting a significant concern with chronic ulcers related to diabetes **(Figure 4).**

Figure 4: Keyword analysis in studies on advanced dressings.

Source: Authors' own work, 2024.

The word cloud can be generated based on the frequency of the provided words and the analysis of collected data. For articles published in PubMed on advanced dressings, the most frequent words reveal a thematic pattern. In Portuguese, the most prominent words were *tratamento* and *randomizado*, with sizes proportional to their frequencies of 20 and 15 occurrences, respectively. Other related terms, such as *feridas*, *curativos*, and *ensaios clínicos*, may be included to enrich

the visualization. In English, the most frequent words were *wound*, *controlled*, and *treatment*, with frequencies of 12, 11, and 10 occurrences, respectively. Words such as *healing*, *care*, and *advanced dressing* can also be integrated to capture the context of advanced dressings **(Figure 5).**

Figure 5: Titles of articles in studies on advanced dressings.

Source: Authors' own work, 2024.

DISCUSSION

The analysis of different postoperative therapies and interventions highlights the effectiveness of new approaches to reducing complications and optimizing recovery in patients undergoing surgery, especially in the context of cancer. For example, one study demonstrated that incisional negative-pressure therapy can be useful in preventing complications in pediatric patients with non-idiopathic scoliosis, providing benefits such as reduced infections and seroma formation [5].

The effectiveness of antimicrobial dressings was explored in a study that investigated the use of ionic silver dressings to prevent infections in colorectal surgeries [14]. Although the results did not show a statistically significant difference, the study suggests that advanced dressings may be a promising option, especially in at-risk populations.

The comparison between treatments for partial-thickness burns also illustrates the importance of innovations in dressings [17]. This research presents a series of comparative studies on innovative treatments for skin lesions, focusing on burns and chronic ulcers, in which different technologies and dressing materials were used. The study compared the use of nanocrystalline silver dressings with traditional silver sulfadiazine cream. The results showed that the nanocrystalline silver dressing significantly reduced hospitalization time, analgesic use, infection, and wound inflammation. Thus, this type of dressing stands out as a superior approach in the treatment of burns when compared with conventional dressings.

Furthermore, studies demonstrate that advanced dressings and innovative therapies have

a positive impact on the management of postoperative and chronic wounds, not only improving clinical outcomes but also offering a more cost-effective option by reducing the complications associated with conventional treatments[17]. The use of technologies such as polyurethane films and amniotic membrane allografts, for example, offers significant potential to improve patient recovery, optimize healthcare resources, and reduce costs associated with postoperative complications. These findings reinforce the importance of adopting evidence-based practices to improve care quality and healthcare system efficiency.

The effectiveness of treatments was evaluated in randomized clinical trials involving dehydrated human amniotic membrane allograft (dHACA) and dehydrated human umbilical cord (EpiCord), demonstrating advantages over conventional treatment for chronic venous ulcers and diabetic foot ulcers, respectively.

Advances in the treatment of chronic and acute wounds have been driven by innovative approaches that seek to accelerate healing and reduce complications. Recent studies highlight different technologies and biomaterials as effective and safe alternatives for the management of these conditions. A multicenter study evaluated the efficacy of dehydrated human amniotic and chorionic membrane allograft (dHACA) in chronic venous ulcers. After 12 weeks, healing rates were significantly higher in the dHACA-treated groups (75%) compared with standard of care (SOC) (30%), with no adverse events related to the graft (cicatrização). These results suggest that dHACA is a promising option for complex wounds [18]. Another trial analyzed the EpiCord allograft in diabetic foot ulcers, revealing complete healing rates of up to 81% at 12 weeks, superior to alginate dressings (54%). The safety and effectiveness of EpiCord reinforce its potential as an advanced therapy [19].

In the treatment of biofilm-infected wounds, an electroceutical wound dressing (WED) demonstrated reduction or prevention of biofilm formation in more than 50% of treated wounds, highlighting its innovative antimicrobial efficacy [20]. Furthermore, the use of cellulose acetate mesh with soft silicone (CAM) was compared with another standard dressing, both showing excellent tolerance and efficacy in the re-epithelialization of traumatic and post-surgical wounds [21].

In the context of scarring, the efficacy of the embrace device in reducing post-abdominoplasty scars was proven, with significant improvements in overall appearance after 12 months [22]. This data corroborates that the use of advanced scar therapies in aesthetic or reconstructive procedures contributes to better functional and aesthetic results. Additionally, evidence showed that advanced medications considerably reduced healing time in oral mucosal wounds, decreasing from an average of 45 days to as few as 20 days [23]. This result reinforces the importance of bioengineered treatments in managing complex wounds.

In an alternative perspective, the application of Mepitel film in patients with head and neck cancer demonstrated a significant reduction in radiation-induced skin reactions [24]. Although it

was effective in skin protection, adhesion difficulties in bearded male patients were reported, suggesting the need for adaptations for specific populations. Continuous diffusion oxygen therapy (CDO) also showed promising results in reducing scar length in patients undergoing thyroidectomy, but larger sample sizes are needed for conclusive validation [25]. Finally, a cost-effectiveness analysis of single-use negative-pressure wound therapy (sNPWT) for surgical site complications after cardiac surgery showed cost savings and a higher number of healed wounds without complications compared with standard care [26].

This literature review reinforces the importance of therapeutic innovations, such as biological grafts and electroceutical dressings, which have shown promising results in the healing of chronic wounds and in preventing infections, particularly in the context of bacterial biofilm infections. Although adverse event rates varied, none were directly related to the treatments, pointing to the safety of these new materials. The comparison of dressings and treatments also highlighted the superiority of alternative approaches in some cases, suggesting that the integration of these technologies may be key to improving outcomes in the treatment of complex wounds.

These findings emphasize that the use of advanced technologies in dressings and wound therapies offers clinical, functional, and economic benefits. The evidence suggests that research prioritizes the development of advanced dressings, focusing on therapeutic efficacy and technological innovation, aligning with the clinical challenges of complex wounds. However, methodological limitations, such as reduced sample sizes and the need for greater standardization in some interventions, indicate the necessity for more robust studies to consolidate scientific evidence.

CONCLUSION

The present study aimed to analyze the different types of dressings available on the market as advanced therapies for wounds. Emphasis was placed on their compositions, mechanisms of action, indications, and contraindications. Studies show that wound healing is characterized as an essential physiological process in patient care, requiring specialized knowledge and advanced dressings to meet different healing needs.

Com base Based on the results obtained, it can be observed that technologies applied to advanced dressings, such as hydrofiber and hydrocolloid with silver ions to combat bacteria, activated charcoal dressings with alginate, Suprathel, advanced foam dressings for hydrodynamic fluid management, and negative pressure therapy, among others, stand out in wound treatment, accelerating healing, reducing complications, and improving patient quality of life. Furthermore,

when properly managed, they tend to reduce final financial costs for local healthcare administration.

Finally, it was observed that the incorporation of new technologies in wound treatment and the modernization of products emerge as innovative resources in healthcare. However, methodological limitations indicate the need for further studies to consolidate scientific evidence and, consequently, enable effective dissemination in clinical practice.

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